INJECTION METHODS TO REDUCE NITROGEN OXIDES EMISSION FROM GAS TURBINES COMBUSTORS

ABSTRACT

A process having three steps utilized individually or in combination to reduce nitrogen oxides, NO_x, emissions from gas turbines. One or more injectors disperse very fine fuel droplets to achieve rapid and complete combustion in zone one immediately downstream of the fuel injectors. The second step uses one or more injectors inserted into the combustor to disperse water droplets throughout zone two, immediately downstream of zone one, to lower the gas temperature and suppress formation of thermal NO_x,. The third step uses one or more injectors to disperse aqueous droplets containing a dissolved NO_x reducing agent throughout zone three, immediately downstream of zone two, and whose gas temperature favors the reduction of NO_x. Alternatively, the dissolved NO_x reducing agent can be mixed with a liquid fuel to convert zone three into slightly fuel rich conditions, enabling nitrogen oxide reduction at higher gas temperatures.

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